

$D_3^*(2750)$

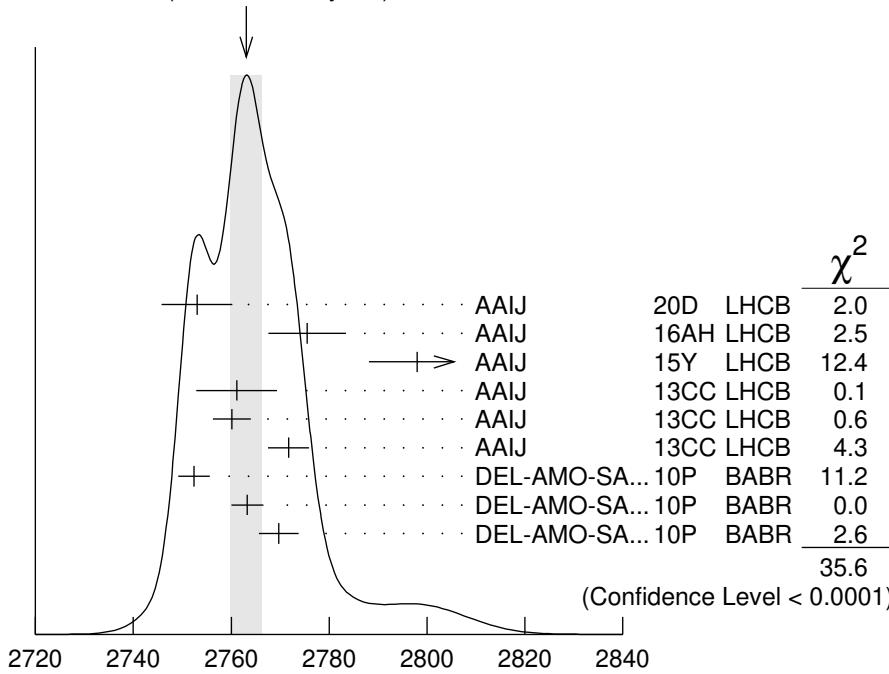
$I(J^P) = \frac{1}{2}(3^-)$

J^P determined by AAIJ 15Y from the Dalitz plot analysis of $B^0 \rightarrow \overline{D}^0 \pi^+ \pi^-$ decays.

$D_3^*(2750)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
2763.1 ± 3.2 OUR AVERAGE		Error includes scale factor of 2.1. See the ideogram below.			
2753 ± 4 ± 6	79k	1 AAIJ	20D LHCb	$B^- \rightarrow D^{*+} \pi^- \pi^-$	
2775.5 ± 4.5 ± 6.5	28k	2 AAIJ	16AH LHCb	$B^- \rightarrow D^+ \pi^- \pi^-$	
2798 ± 7 ± 7		3 AAIJ	15Y LHCb	$B^0 \rightarrow \overline{D}^0 \pi^+ \pi^-$	
2761.1 ± 5.1 ± 6.5	14k	AAIJ	13CC LHCb 0	$p p \rightarrow D^{*+} \pi^- X$	
2760.1 ± 1.1 ± 3.7	56k	AAIJ	13CC LHCb 0	$p p \rightarrow D^+ \pi^- X$	
2771.7 ± 1.7 ± 3.8	20k	AAIJ	13CC LHCb +	$p p \rightarrow D^0 \pi^+ X$	
2752.4 ± 1.7 ± 2.7	23.5k	4 DEL-AMO-SA...10P	BABR 0	$e^+ e^- \rightarrow D^{*+} \pi^- X$	
2763.3 ± 2.3 ± 2.3	11.3k	4 DEL-AMO-SA...10P	BABR 0	$e^+ e^- \rightarrow D^+ \pi^- X$	
2769.7 ± 3.8 ± 1.5	5.7k	4,5 DEL-AMO-SA...10P	BABR +	$e^+ e^- \rightarrow D^0 \pi^+ X$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2802 ± 11 ± 10		6 AAIJ	15Y LHCb	$B^0 \rightarrow \overline{D}^0 \pi^+ \pi^-$	

WEIGHTED AVERAGE
2763.1±3.2 (Error scaled by 2.1)



$D_3^*(2750)$ MASS (MeV)

¹ From a full four-body amplitude analysis of the $B^- \rightarrow D^{*+} \pi^- \pi^-$ decay.

² From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

³ Modeling the $\pi^+ \pi^-$ S-wave with the Isobar formalism.⁴ The states observed in the $D^* \pi$ and $D\pi$ final states are not necessarily the same.⁵ At a fixed width of 60.9 MeV.⁶ Modeling the $\pi^+ \pi^-$ S-wave with the K-matrix formalism.

$D_3^*(2750)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
66 ± 5 OUR AVERAGE					
66 ± 10 ± 14	79k	1 AAIJ	20D LHCb	$B^- \rightarrow D^{*+} \pi^- \pi^-$	
95.3 ± 9.6 ± 34.0	28k	2 AAIJ	16AH LHCb	$B^- \rightarrow D^+ \pi^- \pi^-$	
105 ± 18 ± 24		3 AAIJ	15Y LHCb	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$	
74.4 ± 3.4 ± 37.0	14k	AAIJ	13CC LHCb 0	$p p \rightarrow D^{*+} \pi^- X$	
74.4 ± 3.4 ± 19.1	56k	AAIJ	13CC LHCb 0	$p p \rightarrow D^+ \pi^- X$	
66.7 ± 6.6 ± 10.5	20k	AAIJ	13CC LHCb +	$p p \rightarrow D^0 \pi^+ X$	
71 ± 6 ± 11	23.5k	4 DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^{*+} \pi^- X$	
60.9 ± 5.1 ± 3.6	11.3k	4 DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^+ \pi^- X$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
154 ± 27 ± 16		5 AAIJ	15Y LHCb	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$	

¹ From a full four-body amplitude analysis of the $B^- \rightarrow D^{*+} \pi^- \pi^-$ decay.² From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.³ Modeling the $\pi^+ \pi^-$ S-wave with the Isobar formalism.⁴ The states observed in the $D^* \pi$ and $D\pi$ final states are not necessarily the same.⁵ Modeling the $\pi^+ \pi^-$ S-wave with the K-matrix formalism.

$D_3^*(2750)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 D\pi$	seen
$\Gamma_2 D^+ \pi^-$	seen
$\Gamma_3 D^0 \pi^\pm$	seen
$\Gamma_4 D^* \pi$	seen
$\Gamma_5 D^{*+} \pi^-$	seen

$D_3^*(2750)$ BRANCHING RATIOS

$\Gamma(D^+ \pi^-)/\Gamma(D^{*+} \pi^-)$	Γ_2/Γ_5			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.42 ± 0.05 ± 0.11	34.8k	1 DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^{(*)+} \pi^- X$

¹ The states observed in the $D^* \pi$ and $D\pi$ final states are not necessarily the same.

$D_3^*(2750)$ POLARIZATION AMPLITUDE A_D

A polarization amplitude A_D is a parameter that depends on the initial polarization of the $D_3^*(2750)$. For $D_3^*(2750)$ decays the helicity angle, θ_H , distribution varies like $1 + A_D \cos(\theta_H)$, where θ_H is the angle in the D^* rest frame between the two pions emitted by the $D_3^*(2750) \rightarrow D^* \pi$ and $D^* \rightarrow D\pi$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •	-0.33 ± 0.28	23.5k	¹ DEL-AMO-SA...10P BABR $e^+ e^- \rightarrow D^{*+} \pi^- X$	

¹ Systematic uncertainties not estimated. The states observed in the $D^*\pi$ and $D\pi$ final states are not necessarily the same.

$D_3^*(2750)$ REFERENCES

AAIJ	20D PR D101 032005	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16AH PR D94 072001	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15Y PR D92 032002	R. Aaij <i>et al.</i>	(LHCb Collab.) JP
AAIJ	13CC JHEP 1309 145	R. Aaij <i>et al.</i>	(LHCb Collab.)
DEL-AMO-SA...10P PR D82 111101		P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)